Public Sector Wage Inflation and the Ontario Controls Program

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PUBLIC SECTOR WAGE INFLATION AND THE ONTARIO CONTROLS PROGRAM

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by Douglas Auld and David Wilton

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Douglas Auld is Chairman of the department of economics, at the University of Guelph.

David Wilton is a professor of economics at the University of Waterloo.

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1
Introduction

When Ontario introduced a program of public sector wage controls in 1982, it was not the first time that a Canadian government had used legislation to restrain the collective bargaining process. The Anti-Inflation Board established by the federal government in 1975 subjected both private sector and public sector collective bargaining to controls on the rate of changes in base wages. Ontario's 1982 program, similar programs in other provinces, and the federal government's '6 and 5' program (also implemented in 1982) were unusual in that they applied to the public sector alone. The statements made by politicians at the time touch only superficially on the developments that led both levels of government to such a potentially explosive policy. These developments can be traced back to Parliament's passage of the Public Service Staff Relations Act in 1967.

The purpose of the act was to place the process of wage determination in the public sector on the same basis as the process in the private sector. The act was greeted with enthusiasm by public sector employees at all levels of government, and with suspicion and concern in other sectors of the economy. One commentator had this to say:

> I have been surprised that comparatively little has been written to date about the impact this revolutionary labour relations law might have on our nation. This sleeping giant will soon be awakened and I am convinced that its thundering voice will exert influences hitherto not fully appreciated. (Carson 1967)

Why was such a law viewed as 'revolutionary'? Should not workers have the right to unionize, to freely bargain and – except in absolutely essential activities – to go on strike? Many observers said no in 1967 and would still say no today. The argument against public sector employee parity with the private sector is founded on the belief that, in several important respects, industrial relations are very different in the public sector than they are in the private sector:

1 In the public sector, the employer-employee relationship is indirect; politicians do not negotiate with public sector employees on behalf of the public sector. Management is composed, for the most part, of public sector employees.

2 Given the system of tenure in the public service, wages may not be responsive to changes in the labour market.

3 The profit motive/restraint is missing in the public sector and is replaced by a political motive.

4 Ability to pay, an important consideration in private sector collective bargaining, is of relatively little importance in public sector negotiations.

The validity of these distinctions between the private and public sectors has been the subject of lively debate. Empirical evidence suggests that the main factors that determine changes in private sector wages also determine changes in public sector wages. Clearly the industrial relations framework in the public sector is different in some respects from the framework in the private sector, but it should be recognized that there are a wide variety of institutional arrangements in the private sector. For example, a union may bargain on behalf of workers in different plants and firms, and even in different countries. Ability to pay, while not directly linked to product prices and costs, is a factor in the public sector. Taxation increases do have their limits.

While there was very little understanding of public sector collective bargaining and wage determination in the mid-1970s, there was widespread belief that the rate of increase in public sector wages was a primary force behind the 1973-5 inflation. It would not be an overstatement to say that perhaps the most important reason for the establishment of the Anti-Inflation Board in 1975 was the conviction that wages in the public sector were out of control. However, political considerations required that the incomes policy be universal in its application. By the early 1980s attitudes had changed and, despite a greater understanding of public sector collective bargaining, it was politically feasible to impose wage controls on the public sector alone. The federal government led the way with the introduction of its two-year '6 and 5' program.

On 21 September 1982 the Treasurer of Ontario, Frank Miller, introduced the province's program of public sector wage and price controls (the price controls were imposed on goods and services provided by the public sector). The limit on wage increases was applied broadly: it affected 2,700 collective bargaining contracts representing over 500,000 employees in the provincial government, local government, health, education, and other public and quasi-public sectors in Ontario.

In his speech to the legislature, Mr. Miller repeatedly made the point that controls were necessary to prevent substantial layoffs in the public sector:

> This program, by limiting public sector wage increases attempts to refrain from adding to [unemployment] rolls by avoiding the need for public sector cutbacks and layoffs. (Miller 1982, 10)

In other words, the government was arguing that a fixed allocation from the budget would be applied to public sector wages, and that at current rates of increase in wages this allocation would be insufficient to meet the payroll, thus necessitating layoffs. Lower 'controlled' wage increases would prevent layoffs in the public sector.

Mr. Miller also hinted that public sector increases were influencing settlements in the private sector: 'The program . . . gives the private sector the opportunity to respond on its own to the need for restraint' (ibid.). Furthermore, the program 'should demonstrate to the private sector that we ask no more of them than we do of ourselves' (ibid.).

What, exactly, precipitated the imposition of controls in Ontario? First, and perhaps foremost, the federal government's introduction of its '6 and 5' program in the summer of 1982 provided the Ontario government with a rationale for proceeding with controls of its own. Controls on the public sector in Ontario would hasten the success of the federal anti-inflation program. Second, by the end of the summer of 1982, it was clear that the Canadian economy was in a recession. While recessionary pressures were dampening wage increases in some areas of the private sector, most wage increases in both the private sector and the public sector were still in the 10 to 11 per cent range. In short, there was little evidence in September 1982 that, in the aggregate, wages were responding to the recession. Two facts in particular were probably worrying policy makers:

1 A significant number of public sector contracts negotiated in the second quarter and the early part of the third quarter of 1982 contained wage rate increases of 12 to 15 per cent.

2 Wage increases in a few private sector contracts were in the range of 2 to 6 per cent per annum.

These statistics must have persuaded Mr. Miller that the deepening recession was starting to affect private sector wage contracts. Large public sector wage increases not only put a strain on the treasury but perhaps inhibited a more rapid adjustment in wages and prices in the private sector. The public sector had to be reined in.[1] As we shall see below, however, a breakdown of Ontario public sector wage increases into four categories suggests that not all segments of the public sector were 'out of line' with the private sector in the pre-controls period.

Now that Ontario has experienced the first phase of controls, which ended in late 1983, several questions need to be answered:

1 Were public sector wage settlements in the pre-controls period insensitive to general labour market conditions and therefore unresponsive to the recession?

2 Did large wage settlements in the public sector inhibit the adjustment process in the private sector?

3 Was the Ontario wage restraint program effective in reducing public sector wage inflation?

4 What lessons can we learn from this episode for the future 'management' of public sector wages?

This paper attempts to address these questions. Before we turn to the outline of our research it should be noted that we examined wage behaviour in the Ontario public sector in the 1967-75 period in an earlier study for the Ontario Economic Council (Auld and Wilton 1981). Employing an expectations-augmented Phillips curve wage equation, we observed that during this period public sector wages and private sector wages responded to labour market conditions, price expectations, and price catch-up in a similar manner. Furthermore, we uncovered no statistical evidence to support the existence of wage spillovers from the public sector to the private sector. We shall have occasion to refer to this earlier work in discussing the results of our more recent research.

The paper has seven parts following the introduction. The first part below describes the structure of controls. The second part analyses the pattern of public and private sector wage increases in Ontario, using an Ontario Department of Labour micro data base that contains all wage contracts involving 200 or more employees. The third part uses the same data to estimate a basic wage settlements equation for the Ontario public sector.[2] This data base is considerably richer than Labour Canada's data base, which incorporates only contracts involving 500 or more employees. Many Ontario public sector contracts, particularly in the education and health subsectors, involve 200 to 500 employees. The purpose of this part of the analysis is to determine similarities and differences between private sector and public sector wage behaviour in the 1978-83 period. The public sector wage equation is disaggregated into four sectors: local government, education, health, and provincial government. The fourth section of the paper focuses on the impact of the control program on public sector wages. Did controls have an independent effect on wage settlements in late 1982 and 1983? The fifth part describes the results for the private sector equation covering the 1978-83 period. It also examines the possible impact of public sector controls on the private sector.

As we noted above, Mr. Miller expressed concern that wage settlements in the private sector were being influenced by wage settlements in the public sector, slowing the adjustment process to lower labour costs and less inflation. The notion that wage settlements in one sector influence or spill over into other sectors is, of course, not new. Spillover effects may occur across large areas, but it is more likely that a public-to-private spillover will occur within a relatively narrow geographical area. The fifth part below also considers this point. The sixth part summarizes the findings and offers some tentative conclusions about the need for public sector wage controls. The final part consists of an appendix which presents, in detail, the econometric evidence from which we have derived our conclusions.

2
The structure of controls

The Ontario wage restraint program was not an 'instant freeze'; in fact, a number of contracts ran for almost a year before the 5 per cent restriction was imposed. As Figure 1 illustrates, each contract was assigned to one of four basic groups. All contracts were tied into a transition year (1 October 1981 to 30 September 1982) and a control year (1 October 1982 to 30 September 1983).

GROUND ONE

If a contract expired *before* 1 October 1981 and there was no new settlement as of 21 September 1982, the expired contract was simply extended to the anniversary date within the transition year (1 October 1981 to 30 September 1982). The contract was then placed in a transition period for one year; the wage increase for the transition year could not exceed 9 per cent and the Inflation Restraint Board (IRB) could impose a wage settlement if the parties could not agree. After the one-year transition period, the contract went into a one-year control period, during which wage increases were set at 5 per cent.

GROUP TWO

If the contract expired *after* 1 October 1981 but had not been renewed by 30 September 1982, the contract was placed in a transition period for one year, during which the wage increase could not exceed 9 per cent, and then went into a control year.

FIGURE 1
Transition year: 1 October 1981 to 30 September 1982; control year: 1 October 1982 to 30 September 1983

1981	1982	1983	1984
Group One If plan expired before 1 October 1981 →	Plan extended to anniversary date in transition period →	One-year transition with $\Delta w/w \leq 9$ per cent →	one-year controls with $\Delta w/w = 5$ per cent
	Group Two Plan expires in transition year: → one-year transition with $\Delta w/w \leq 9$ per cent	→	One-year controls with $\Delta w/w = 5$ per cent
		Group Three Plan expires in control year → One-year controls from expiry date with $\Delta w/w = 5$ per cent	
		Group Four Plan expires after 1 October 1983 (multi-year starting from 21 September 1982) → interrupted at anniversary date and controls for one year with $\Delta w/w$ $= 5$ per cent	

GROUP THREE

If the contract expired during the control year, it went directly into a control year on the expiry date.

GROUP FOUR

If a multi-year contract was destined to expire *after* 1 October 1983 (contract in effect before 21 September 1982), it would be interrupted on its anniversary within the control year and placed in a control year.

Two examples of how contracts were treated under this scheme are given in Table 1.

There were no contracts in group 1 in our database. The model used below to test for the effect of controls on wage changes incorporates three dummy variables designed to isolate (i) contracts which were assigned a transition year, (ii) contracts that went directly into a control year, and (iii) contracts whose term was interrupted on the anniversary date.

TABLE 1
Wage contracts and assignment to transition and control years: two examples

Status of contract as of 21/09/82	First stage	Second stage	Third stage
1.			
no settlement of contract that expired 21 July 1982; last contract called for 8.5 per cent annual wage increase	contract extended to 20 July 1982 with 8.5 per cent wage compensation	contract goes into transition year (21 July 1982 to 20 July 1983), in which wage increase may not exceed 9 per cent	contract is in control year from 21 July 1983, with wage increase set at 5 per cent[a]
2.			
contract expires 4 March 1984			contract is in control year from 5 March 1983 to 4 March 1984, with wage increase set at 5 per cent

[a] There were exceptions for those on lower incomes.

3

The pattern of wages in the public and private sectors

Table 2 and Figures 2 to 7 present the average wage settlement in each quarter of the years 1978 through 1983 for the Ontario private sector, the Ontario public sector, and four components of the public sector (education, provincial government, local or municipal government, and health and welfare). Clearly, average wage settlements in Ontario's public sector were very similar to those in the province's private sector throughout the post-Anti-Inflation Board, 1978-83 period. In fact, the correlation between average wage settlements in the private sector and the public sector still exceeds 75 per cent. Wage settlements in both the private sector and the public sector increased during the late 1970s, reached a peak in mid-1981, and declined rapidly during the latter part of 1982 and 1983. By the fourth quarter of 1983, wage settlements in the Ontario public sector were averaging only 4.9 per cent and wage settlements in the Ontario private sector were down to a 5.1 per cent average (record lows since Labour Canada began tabulating wage contract data in 1967). During this six-year period as a whole, public sector wage settlements were, on average, 0.60 per cent per annum lower than wage settlements in the Ontario private sector (9.17 per cent compared with 9.77 per cent). Of the four components of the public sector, only the health subsector achieved wage settlements that were higher on average than those obtained in the private sector (10.33 per cent compared with 9.77 per cent); the health subsector's relative advantage was largely the result of some very 'healthy' settlements in 1981 and 1982. By contrast, wage settlements in the education subsector averaged more than one full percentage point per annum less than private sector wage settlements (8.6 per cent compared with the private sector's 9.77 per cent).

TABLE 2

Average per annum wage settlements in Ontario for contracts without COLA clauses 1978-83: per cent of wage increases (number of contracts signed in quarter in parentheses)

	Private sector	Total public sector	Education sector	Provincial sector	Local sector	Health sector
1978Q2	6.73% (62)	6.20% (88)	6.25% (33)	5.53% (3)	5.68% (26)	6.72% (26)
Q3	8.60 (83)	6.38 (61)	6.18 (32)	6.44 (3)	7.04 (12)	5.82 (14)
Q4	8.27 (52)	5.44 (75)	6.27 (38)	6.05 (2)	5.21 (5)	5.38 (30)
1979Q1	8.88 (36)	6.99 (46)	7.08 (29)	10.71 (1)	7.02 (10)	5.88 (6)
Q2	9.67 (56)	7.60 (94)	8.07 (34)	7.90 (15)	7.38 (16)	7.00 (29)
Q3	9.03 (14)	8.82 (95)	7.55 (27)	9.22 (1)	8.97 (28)	9.57 (39)
Q4	9.62 (23)	8.19 (49)	8.19 (19)	– (0)	9.50 (6)	7.86 (24)
1980Q1	10.85 (26)	9.05 (86)	8.36 (41)	10.11 (5)	9.29 (24)	10.12 (16)
Q2	9.83 (69)	9.07 (86)	8.90 (58)	9.87 (3)	8.82 (15)	10.20 (10)
Q3	11.77 (56)	10.37 (39)	9.45 (19)	11.76 (4)	10.81 (8)	11.40 (8)
Q4	12.04 (44)	10.13 (33)	9.69 (21)	10.04 (1)	10.74 (8)	11.65 (3)
1981Q1	11.97 (32)	12.16 (45)	11.23 (13)	13.04 (9)	11.70 (15)	13.53 (8)
Q2	12.38 (47)	15.13 (122)	10.71 (41)	13.12 (3)	12.44 (22)	19.52 (56)
Q3	13.22 (15)	13.24 (48)	12.32 (32)	– (0)	12.88 (10)	18.75 (6)
Q4	11.81 (26)	14.45 (69)	12.74 (23)	– (0)	13.44 (7)	15.63 (39)
1982Q1	10.64 (21)	13.66 (60)	11.69 (30)	12.70 (4)	12.49 (14)	20.26 (12)
Q2	11.42 (67)	12.25 (77)	11.55 (49)	14.00 (7)	12.46 (14)	14.95 (7)
Q3	10.95 (44)	11.20 (59)	11.04 (31)	14.46 (2)	11.49 (10)	10.90 (16)
Q4	9.54 (49)	7.99 (39)	8.70 (28)	6.99 (2)	5.99 (9)	– (0)
1983Q1	8.78 (49)	6.88 (188)	7.14 (46)	6.30 (17)	5.29 (26)	7.49 (89)
Q2	7.35 (59)	5.77 (173)	5.80 (120)	5.24 (2)	6.10 (20)	5.46 (31)
Q3	6.27 (26)	5.21 (78)	5.28 (43)	5.00 (3)	5.44 (6)	5.07 (26)
Q4	5.11 (28)	4.92 (19)	5.18 (3)	– (0)	3.08 (2)	5.12 (14)

FIGURE 2

Wage settlements in Ontario, 1978-83 (annualized quarterly percentage change in base wage rates)

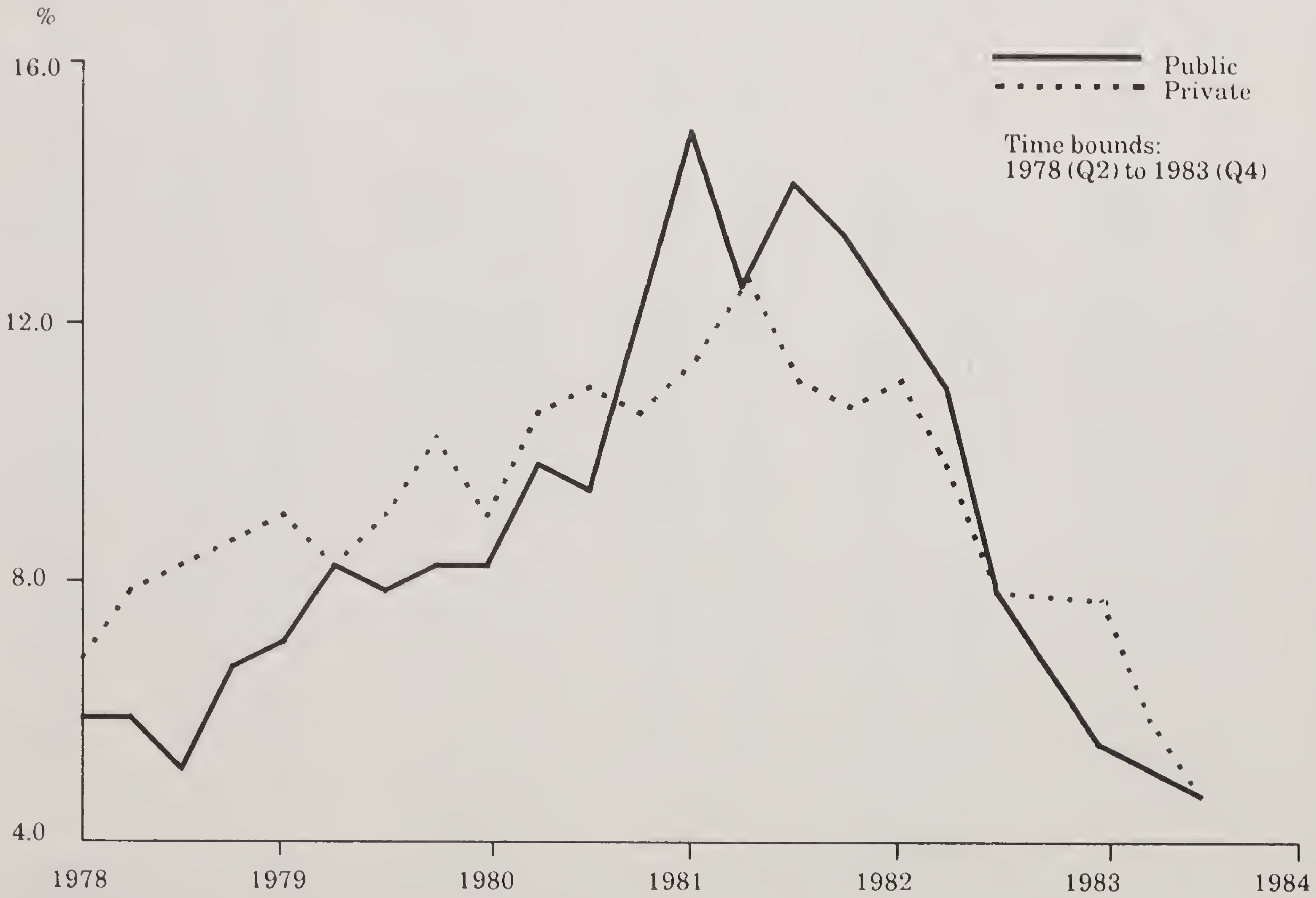


FIGURE 3
Index of base wage rates in Ontario, 1978-83 (annualized quarterly percentage change)

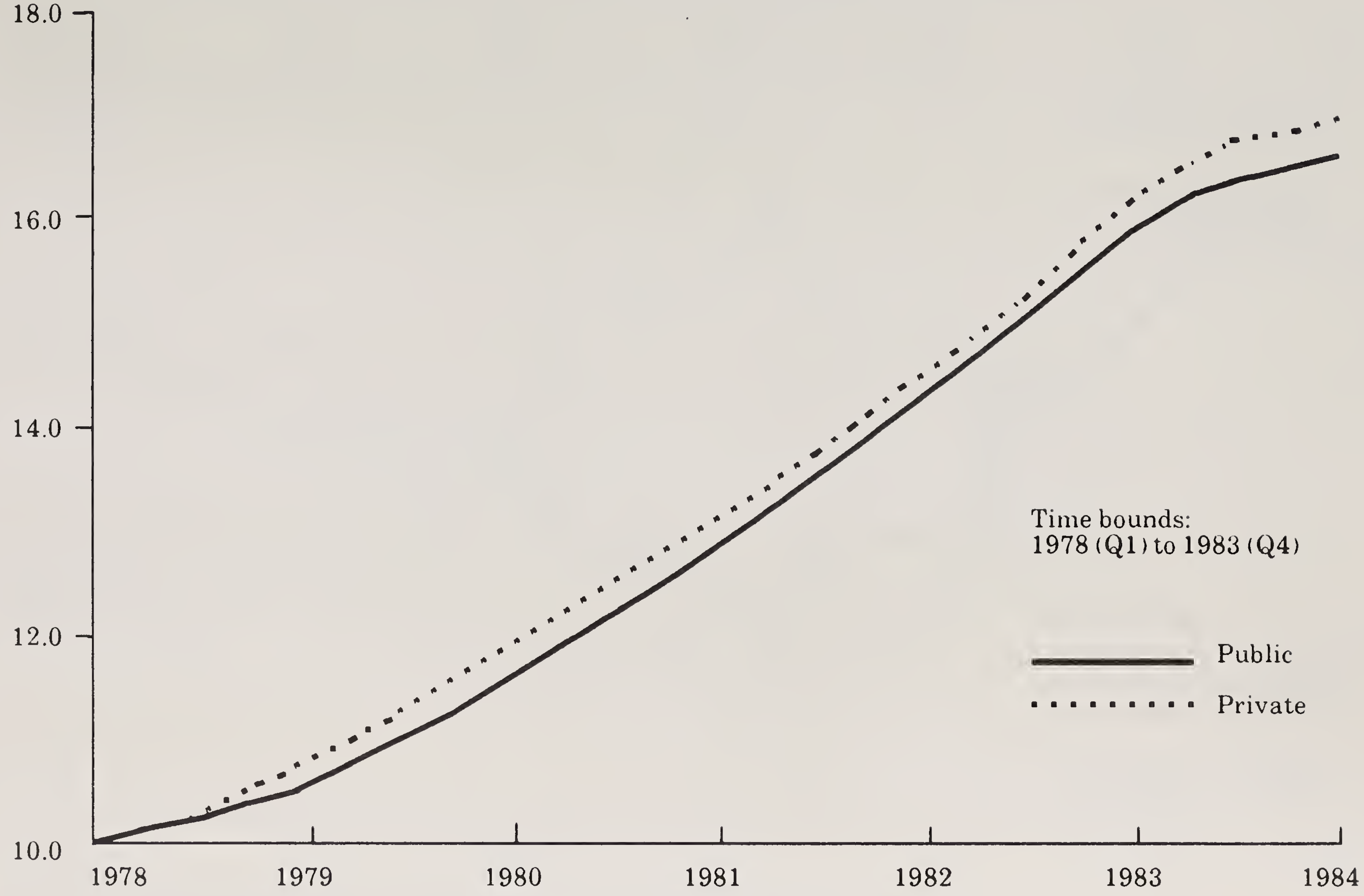


FIGURE 4

Wage settlements in Ontario, 1978-83 (annualized quarterly percentage change in base wage rates)

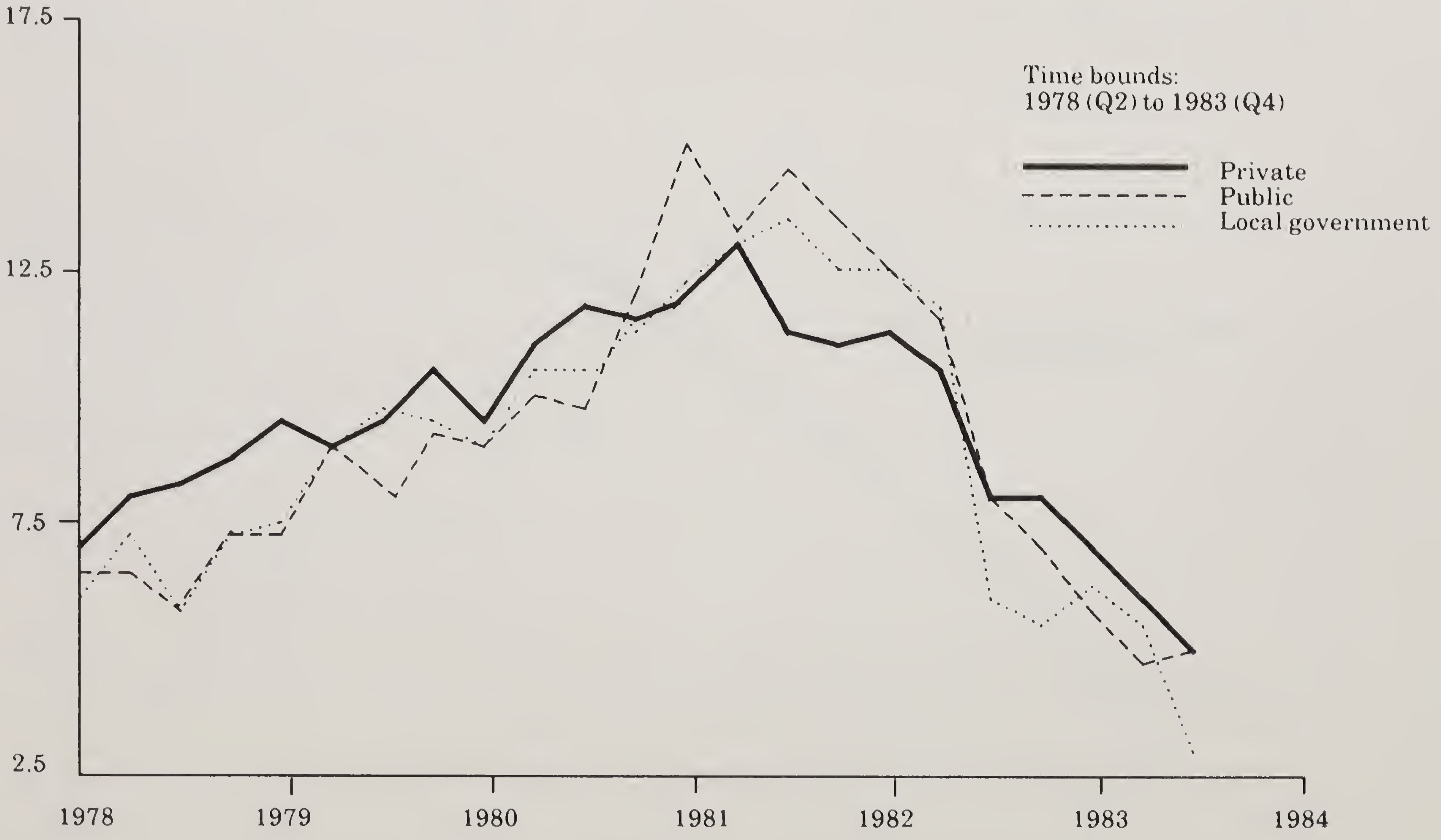
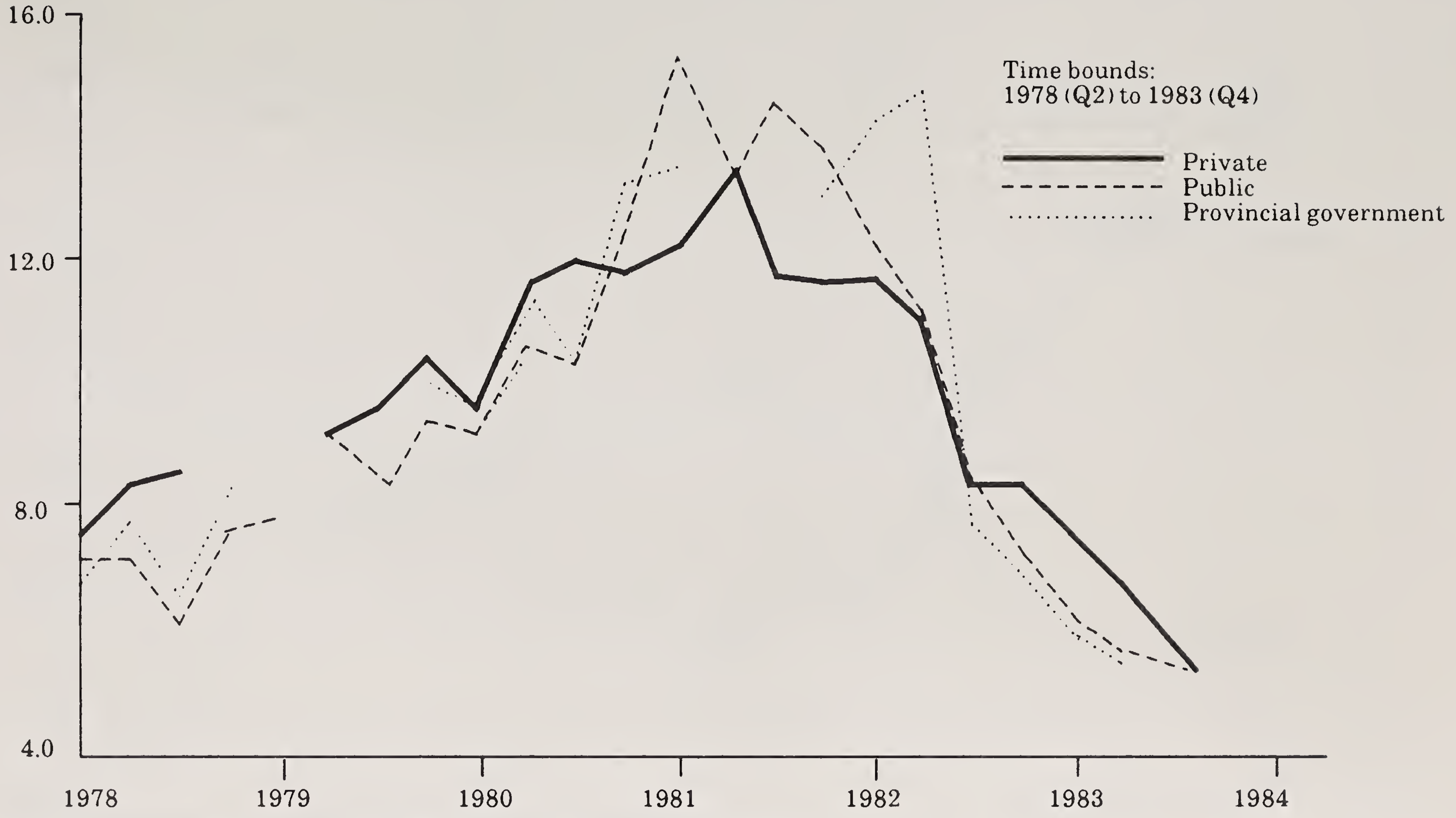


FIGURE 5
Wage settlements in Ontario, 1978-83 (annualized quarterly percentage change in base wage rates)



NOTE: Gaps in lines indicate quarters where no contracts were signed.

FIGURE 6
Wage settlements in Ontario, 1978-83 (annualized quarterly percentage change in base wage rates)

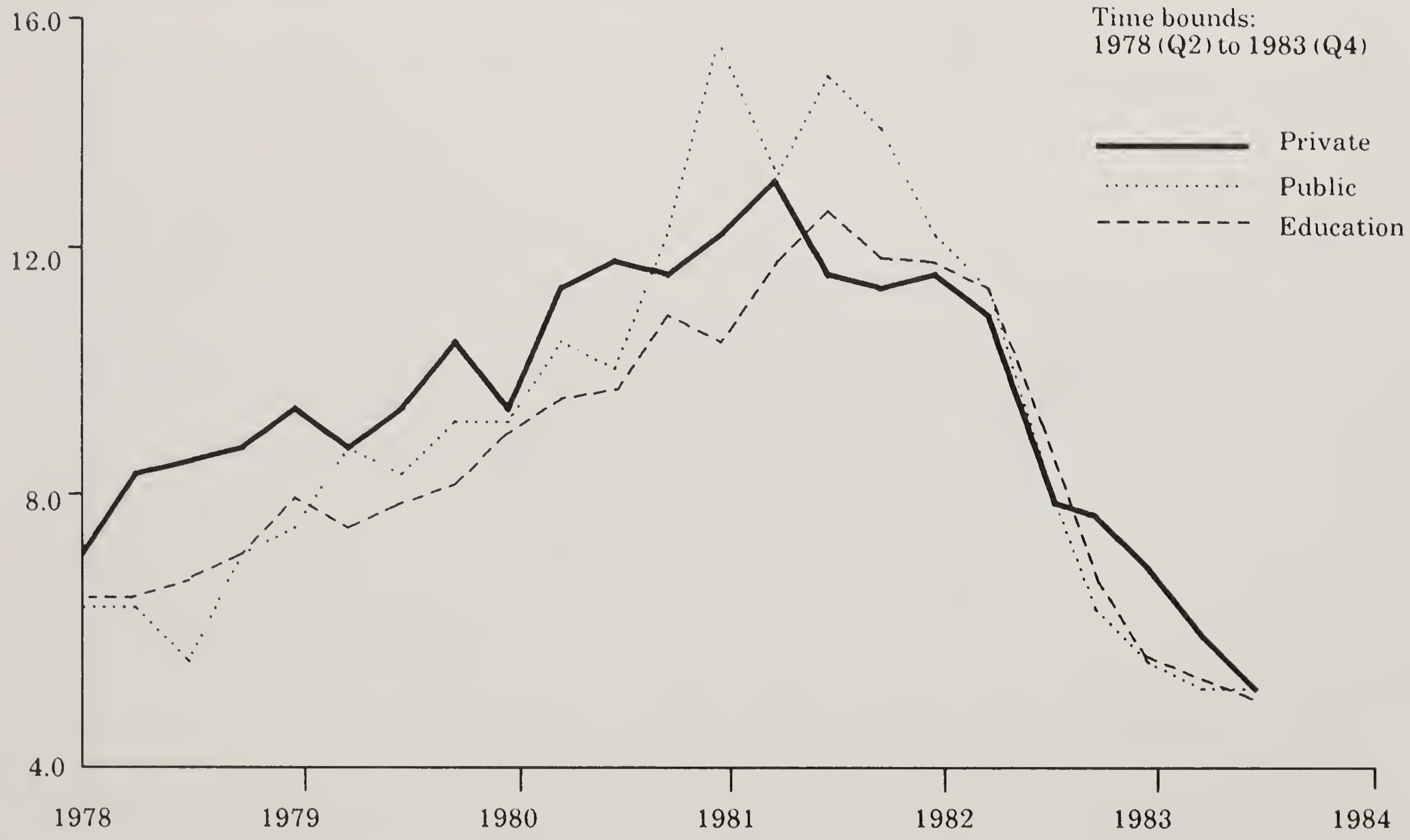
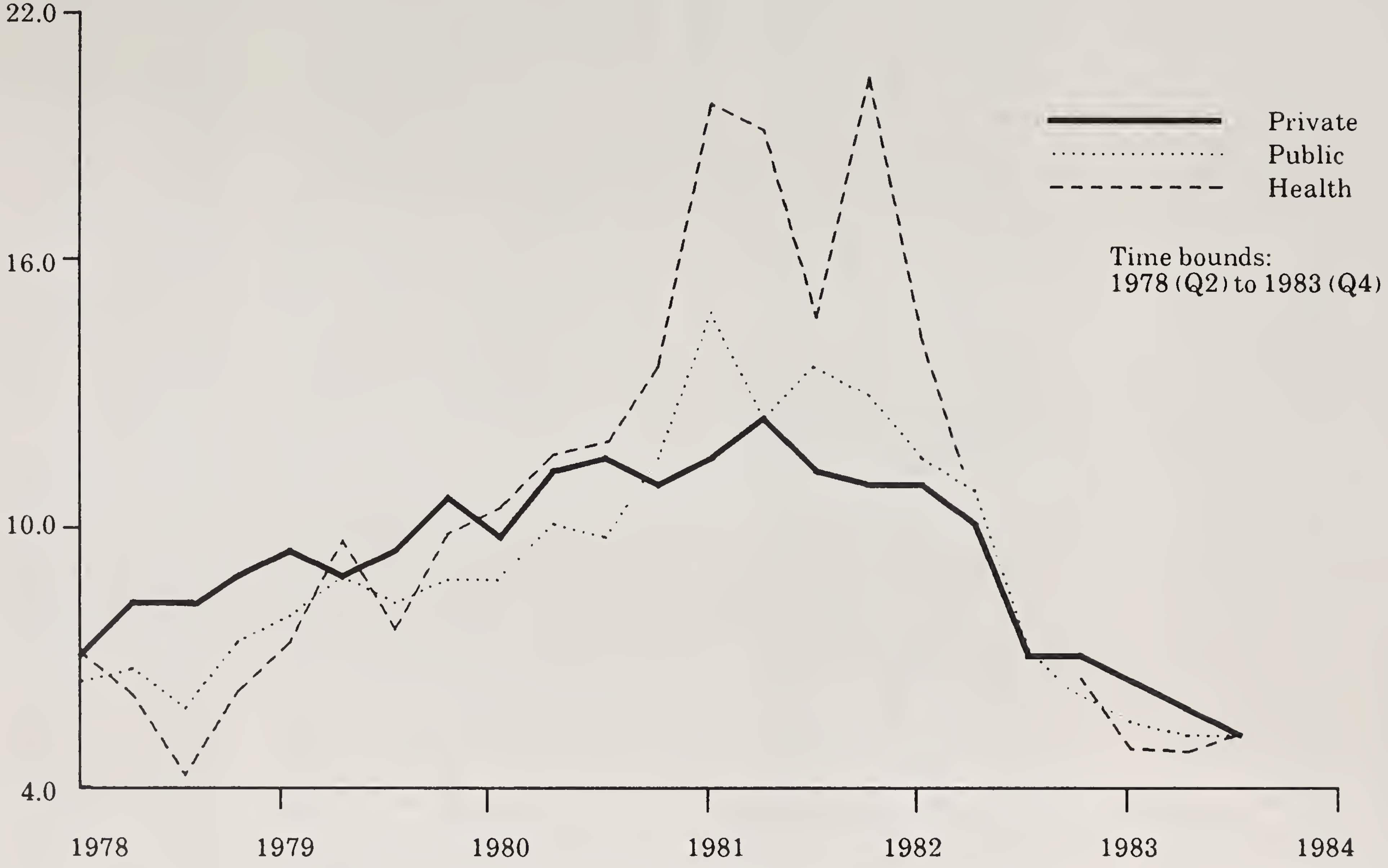


FIGURE 7
Wage settlements in Ontario, 1978-83 (annualized quarterly change in base wage rates)



NOTE: Gaps in health line indicate quarters where no contracts were signed.

4

Wage determination in the Ontario public sector

An assertion frequently advanced in support of wage controls in the public sector is that public sector wages are unresponsive to the usual forces that shape wage changes in the private sector.[3] In our 1981 study for the Ontario Economic Council, we estimated a basic wage equation for both sectors and found considerable similarity in the responses of wages in the two sectors to labour market conditions, price expectations, and unexpected and past inflation (Auld and Wilton 1981).

We have used the same basic equation to examine wage inflation in the public and private sectors in Ontario during the 1978-83 period; the details of this exercise are set out in the appendix to this paper. In summary, it is postulated that changes in base wage rates in both the public sector and the private sector are determined by (i) inflation expectations, (ii) price catch-up, or compensation for past unexpected (and uncompensated) inflation, and (iii) labour market variables (as measured by either the unemployment rate or the help-wanted index in Ontario). The basic econometric results for the public sector in the 1978-83 period, and comparison of these results with those for the 1967-75 period, lead to several important conclusions:

1 Inflation catch-up does not appear to have been an important factor in public sector wage changes in the later period, though it was a dominant influence in the earlier period.

2 The inflation expectation variable is highly significant; it has a coefficient value in excess of unity.

3 Wage settlements in the public sector respond to labour market conditions.

4 In the equations for 1978-83 there are large and significant negative constant terms, in striking contrast to the insignificant and positive constant terms in the equations for the earlier period. Our econometric results suggest that for the Ontario public sector in the 1978-83 period any unemployment rate in excess of 5.5 per cent yielded a *negative* percentage change in the *real* wage. The magnitude of this negative effect differed from one subsector to another.

Because of the differences in the paths of wage changes in the four subsectors of the Ontario public sector, we ran separate wage equations for each subsector. The basic equation worked rather well in all four cases, and labour market and price expectations variables emerged as significant determinants of wage changes. These results are in contrast to our results for the earlier period, in which the price expectations variable was significant in only one subsector, and in three of the four subsectors the labour market variable had a sign that suggested a 'perverse' relationship between wage inflation and unemployment.[4]

5

The impact of wage controls

These econometric results encompass the first five quarters of Ontario's wage restraint program – that is, late 1982 and 1983. It is clear that a large number of contacts fell under the controls program, in one way or another, during this period.

To test the hypothesis that wage controls exerted a significant and independent effect on public sector wage settlements, we incorporated into the basic wage equation control 'dummy' variables that corresponded to the explicit form of the controls in the period when the contract was signed. For example, if a contract had expired in July 1982 and was not renewed by 30 September 1982, that bargaining group was placed in a transition year and permitted a wage increase of up to 9 per cent. Suppose that the union and the management settled on 7.5 per cent. This would be the wage settlement for July 1982 to July 1983, and the dummy variable (transition) contract would be assigned a value of one, while a value of zero would be assigned to the dummy variables for direct controls and interrupted contracts. If a contract was directly controlled, a value of one was assigned to the direct controlled dummy and so forth.

The results of the econometric work, which were described in detail in the appendix, suggest the following:

1 Controls may have provided a floor for wage increases in the public sector as a whole. Without the fixed transition year, which limited wage settlements to a maximum of 9 percent, wage inflation would likely have been 0.5 to 2 percentage points lower. Contracts that were

directly controlled (i.e., limited to a 5 per cent wage increase) were moderately inflated.

2 Controls appear to have depressed wages in three of the public sector's four basic subsectors (education, local government, and provincial government). The econometric results suggest that wage increases would have been 1 or 2 percentage points higher in the absence of controls.

3 For the health subsector, the results suggest that wage increases would have been lower in the absence of controls than they were under transition controls.

4 Thus the positive or 'perverse' effects of controls on the total public sector can be traced to the health subsector.

6

Comparisons with the Ontario private sector

Our 1981 Ontario Economic Council study estimated a basic wage equation for the private sector. We have repeated this exercise in order to determine (a) if there are any major differences between wage determination in the public sector and the private sector and (b) if public sector controls had any influence on private sector wages, independent of the influence of changes in price inflation and the labour market. The latter part of 1982 saw the Canadian economy begin its slide into a recession. Unemployment rose rapidly and price inflation declined, and both of these developments were likely to affect the wage path in the private sector.

Our econometric results indicate the following:

1 Inflation expectations and price catch-up were both important determinants of the change in private sector base wage rates. A comparison of our results for the private sector with those for the public sector indicate that price expectations were less important as a determinant of wage changes in the private sector.

2 The constant term in the basic private sector equation is negative but much smaller in absolute value than it is in the public sector equation.

3 The labour market variable (either the help-wanted index or the unemployment rate) significantly affected the size of wage settlements.

4 The structure of the equation for the private sector suggests that, on average, *real* wage increases are negative only when the unemployment rate reaches 7 or 8 per cent; the comparable figure for the public sector is 5.5 per cent.

To test for the possibility of an indirect effect of controls on the private sector, we added a dummy variable for the controls period 1982(Q4) to 1983(Q4) to the private sector wage settlement equation. The results suggest that controls may have exerted a modest negative effect on private sector wages (with coefficient values ranging from −0.3 to −1.3). We say 'modest' because the coefficient on the control dummy, while negative, is not necessarily significantly different from zero.[5]

SPILLOVERS

As we noted in the introduction, the treasurer of Ontario suggested that high wage settlements in the public sector were spilling over into the private sector, inhibiting the movement to lower wages and costs in the Ontario economy. This suggestion was not new. It has often been argued that the wage inflation process is intensified by wage differences between different groups of workers (see Auld and Wilton 1981, 18-19). Is it possible to detect the presence of wage spillovers in a statistical sense?

To minimize the statistical problems associated with measuring or detecting spillovers, it is necessary not only to employ micro wage contract data, as we do in this study, but to include any spillover variables with the other factors that influence a given settlement. This we have done as well.

The spillover variable (for this private sector model) is the rate of change in base wage rates in the public sector contract immediately preceding a private sector contract. We also included the four public sector contracts preceding the most recent contract as additional public spillover variables. The results of this investigation can be summarized as follows:

1 The last and penultimate public sector contracts significantly increased wage settlements under private sector contracts during the 1978-83 period, but only by about one-fifth of one percentage point.

2 The three public sector contracts preceding the two most recent contracts had no statistical influence on private sector contracts.

3 The inclusion of public sector spillovers reduced the influence of the other variables (price expectations, unemployment) on private sector wage increases.

It is generally agreed that industry specific spillovers in the private sector should be included in any spillover analysis.[6] We divided the private sector into fifteen spillover reference groups in our analysis. These groups are listed and defined in the appendix. When these private sector spillover variables are included in the private sector wage equation, they show themselves to be far more important than the public sector spillovers. In short, there is no strong statistical evidence that public sector wage settlements influence settlements in the private sector in a major way.

7
Summary and conclusion

This study has used a basic wage determination equation to examine the impact that key economic variables have on wage changes in Ontario's public and private sectors. The evidence, based on a large number of contracts in *both* the public sector and the private sector, suggests that price expectations and labour market conditions influence wage inflation. The relative importance of the explanatory variables varies not only from one sector to the other, but also within the disaggregated public sector. Nevertheless, there is no evidence to suggest that aggregate public sector wage increases were determined in a radically different manner over the 1978-83 period than were wage increases in the private sector. The story is somewhat different at the disaggregate level, particularly for the health subsector.

The Ontario public sector wage control program appears to have slightly dampened wage rate increases during the controls period in the education, local government, and provincial government subsectors. On the other hand, controls may have overcompensated employees in the health subsector. While a floor set above the market-determined wage may well draw wage settlements above the floor, we note that health subsector settlements were in fact always above the wage guidelines. Controls also appear to have had a very modest impact in dampening wages in the private sector.

Our analysis of spillovers found that industry specific spillovers in the private sector were very important during the 1978-83 period. The impact of public sector settlements on private sector settlements was minimal. These findings agree with our earlier analysis of public and private sector wage determination, which covered the period 1967-75.

What is different about the more recent period is the absence of price catch-up as an important influence on public sector wages and the emergence in all of our equations of a large negative constant term suggesting a structural shift in the wage-price-unemployment nexus. Because of this instability we urge caution in the interpretation of our results. Wage behaviour in the health subsector continues to be puzzling. Our analysis of both periods indicates a structural wage equation in the health subsector that is quite different from the equations for the other public subsectors. We can only speculate that the pressure in both periods of a few very large wage settlements in the health subsector may have distorted the basic structural model.

In conclusion, the statistical results suggest to us that there is no strong case for permanent wage controls in the public sector. The response of public sector wages to price expectations and labour market conditions has been similar to the response of private sector wages. Whether public sector wages have responded at the same speed as wages in the private sector is not known. While the controls appear to have had modest wage-dampening effects on some public sector contracts, these effects must be weighed against both the direct and the indirect costs associated with the controls program. The direct costs are readily identified. First, there are the compliance costs borne by public sector managers, such as local hydro authorities and school boards. Second, there are the costs associated with the administration of bargaining units to ensure compliance with the controls. Third, there are the costs associated with the monitoring agency and the establishment of controls legislation. The indirect costs are much more difficult to pinpoint. The abrogation of certain rights associated with collective bargaining must be counted as one such cost. Another cost arises if public sector controls, by limiting managers' ability to reward exemplary performance, cause resignations of highly productive personnel. Management's inability, given controls, to increase wages in the presence of sector-specific excess demand would also lead to resource misallocation.

Appendix

This appendix presents, in detail, the econometric evidence from which we derived the conclusions offered in the body of the paper. Our empirical analysis is based on 1,730 wage contracts signed in the Ontario public sector and 995 wage contracts signed in the Ontario private sector during the post-Anti-Inflation-Board period – that is, from April 1978 to December 1983. We obtained information on these 2,725 wage contracts from the Ontario Department of Labour. Unfortunately, we could not include wage contracts that contained COLA clauses in our sample, since information on the exact nature of the COLA clauses was not available. We used the same basic methodology and theoretical models as we used in our earlier Ontario Economic Council report (Auld and Wilton 1981). For a discussion of the basic theory behind our econometric equations, we refer the interested reader to the earlier OEC report (particularly to appendices A and B) and to a monograph prepared by the present authors and others for the Anti-Inflation Board (Auld et al. 1979).

In the 1981 OEC report, we estimated a price-expectations augmented Phillips curve for the Ontario public and private sectors during the pre-Anti-Inflation-Board period (1967-75). We assumed that each individual wage settlement depended on Ontario labour market conditions, inflation expectations, and inflation catch-up for unexpected (and uncompensated) inflation over the previous contract period. The precise form of the equation estimated was as follows:

$$\Delta w_t / w_{t-1} = c + a \Delta P^e_t / P^e_{t-1}$$

$$+ b[(\Delta P^a_{t-1} / P^a_{t-2} - a \Delta P^e_{t-1} / P^e_{t-2}) \, l_{t-1} / l_t] + dX_t$$

where

$\Delta w_t / w_{t-1}$ = the annual compound percentage change in the base wage rate during the current contract period,

$\Delta P^e_t / P^e_{t-1}$ = the expected annual inflation rate over the current contract period,

$\Delta P^a_{t-1} / P^a_{t-2}$ = the actual annual inflation rate over the previous contract period,

l_t = the length of the current contract period in years,

X_t = a measure of labour market conditions,

and c, a, b, and d are parameters to be estimated. We obtained information on $\Delta w_t / w_{t-1}$, l_t, and l_{t-1} directly from the Ontario Department of Labour, and we used the change in the consumer price index over the previous contract period (expressed at an annual rate) to determine $\Delta P^a_{t-1} / P^a_{t-2}$. An autoregressive forecasting equation, based on quarterly changes in the consumer price index, provided the estimates for inflation expectations, $\Delta P^e_{t-1} / P^e_{t-2}$.

Finally, we experimented with a number of proxy variables for labour market conditions, including the Ontario help-wanted index (normalized by the size of the Ontario labour force) and the Ontario unemployment rate. For a full discussion of the theoretical model and a presentation of the parameter estimates for the pre-Anti-Inflation-Board period (1967-75), we again refer the interested reader to our 1981 report (particularly pages 27-34).

To examine wage inflation in the post-Anti-Inflation-Board period, we re-estimated the basic theoretical model over the period April 1978 to December 1983 (using an updated autoregressive forecasting equation to produce estimates of inflation expectations). The first two rows of Table A1 provide wage settlement regressions for the total Ontario public sector, using the reciprocal of the Ontario unemployment rate and the normalized Ontario help-wanted index to represent Ontario labour market conditions. Since the inflation catch-up variable requires information on the previous contract, these two regressions contain only 1,537 public sector wage settlement observations; 193 observations had to be deleted from the sample because of a lack of data on the previous contracts.

A comparison of the parameter estimates for the total public sector in the 1978-83 period with the estimates for the 1967-75 period reveals a number of important differences. First, and most important, the parameter estimate for inflation catch-up during the 1978-83 period is not significantly different from zero. Owing to the unprecedented burst of unexpected inflation in the early 1970s, the inflation catch-up variable was the dominant explanatory variable in the earlier regression period (1967-75), having an estimated coefficient value of 0.57 with a *t*-statistic of 6.75. However, the relative stability of inflation in the late 1970s and early 1980s and the persistent downward trend in inflation in late 1982 and 1983 minimized the need for inflation catch-up wage increases in the 1978-83 period. Given the more stable recent inflation rate and lack of inflation catch-up wage demands, it is perhaps not surprising that the inflation expectations coefficients were highly significant in the more recent period, with estimated coefficient values in the neighbourhood of unity. Both the reciprocal of the unemployment rate and the normalized help-wanted index are also highly significant determinants of wage settlements in the Ontario public sector. The estimated coefficient on the help-wanted index variable for the 1978-83 period (0.165 in the second row of Table A1) is slightly higher than the corresponding value for the earlier period (0.14 in our 1981 study). Finally, there are very large and significant negative constants or intercepts for the 1978-83 period, in contrast to insignificant positive intercepts for the 1967-75 period. Clearly there was an important structural shift in the public sector wage settlements equation during the more recent period. Wage settlements in the 1978-83 period were more restrained than they were in the 1967-75 period; they were also somewhat more responsive to labour market conditions, much more

TABLE A1
Ontario public sector wage settlement regressions (*t*-statistics in parentheses)

Constant	Inflation expectations	Inflation catchup	Reciprocal unemployment	Help wanted index	Contract directly controlled	Transition contract	Interrupted contract	SEE[a]	R^2
–11.82	1.40	0.02	52.63	–	–	–	–	3.127	0.446
(39.12)	(76.74)	(1.32)	(17.54)	–	–	–	–		
–7.72	1.20	0.03	–	0.165	–	–	–	3.029	0.480
(11.60)	(19.21)	(1.92)	–	(18.89)	–	–	–		
–12.61	1.44	–	55.80	–	–	–	–	3.208	0.432
(21.04)	(27.93)	–	(20.34)	–	–	–	–		
–8.52	1.24	–	–	0.177	–	–	–	3.108	0.467
(16.76)	(24.15)	–	–	(23.54)	–	–	–		
–15.24	1.42	0.02	74.78	–	1.28	1.97	–0.68	3.116	0.451
(38.22)	(24.66)	(1.11)	(38.58)	–	(4.86)	(5.75)	(1.08)		
–8.39	1.10	0.05	–	0.210	0.97	1.94	–0.49	3.007	0.487
(11.56)	(15.32)	(2.72)	–	(13.69)	(2.62)	(4.29)	(0.77)		
–15.71	1.44	–	76.46	–	1.14	1.92	–0.79	3.195	0.437
(11.91)	(26.74)	–	(9.61)	–	(2.26)	(3.45)	(1.29)		
–9.24	1.19	–	–	0.211	0.53	1.60	–0.74	3.091	0.473
(14.59)	(21.90)	–	–	(14.70)	(1.63)	(4.01)	(1.26)		

NOTES: Data applies to years 1978-83. Constants vary due to different specifications.
a Standard error of estimates.

sensitive to inflation expectations, and much less influenced by inflation catch-up demands.

Since the inflation catch-up variable was insignificant in the public sector wage regressions based on the 1978-83 period, we re-estimated the model to exclude inflation catch-up considerations (using the entire sample of 1,730 public sector wage contracts). As rows three and four of Table A1 show, inflation expectations and both labour market variables continued to be highly significant factors in determining the size of wage settlements in the Ontario public sector (with *t*-statistics in excess of 20). In both equations the coefficient estimate for inflation expectations is significantly greater than unity. However, the constants have very large negative values, offsetting the relatively high estimated coefficients for the inflation expectations and labour market variables. For example, using the estimated coefficients in row 3 of Table A1, a 10 per cent inflation rate and an 8 per cent unemployment rate generate a public sector wage settlement of only 8.8 per cent; that is, a decline of 1.2 per cent in the real wage. For an expected inflation rate of 5 per cent, the regression results suggest that public sector wages will decline in real terms for all Ontario unemployment rates in excess of 5.4 per cent. Unlike the 1967-75 Ontario public sector wage structure (which was not significantly different from the private sector wage structure), the Ontario public sector wage structure in the 1978-83 period can be characterized in three words: real wage restraint.

As we noted in the body of the paper, the Ontario government program of provincial wage controls recognized several different contractual patterns. Public sector employees whose wage contract expired during the first year of controls entered the controls program (with a wage increase set at 5 per cent) on the expiry date of the pre-controls contract. In total, 348 of our sample of 1,730 public sector contracts were directly controlled in this manner. Public sector employees whose previous contract had expired but who had not negotiated a new contract by the time controls were implemented were given a transition year, the conditions of which are described in the body of the paper. Our sample of public sector wage contracts includes 147 such 'transition' contracts. Finally, contracts that were signed before the introduction of controls but that expired after the first year of controls were interrupted on their anniversay date, and a wage increase of 5 per cent was imposed for the final year of the contract. There were only 30 interrupted public sector contracts in our sample. The remaining 1,205 public sector wage contracts in our sample were signed before the controls program was introduced and were unaffected by wage controls.

To determine whether wage controls exerted a significant independent effect on public sector wage settlements, we included a set of control dummy variables in the wage settlement regressions. We established separate dummy variables for the 348 contracts that were directly controlled, the 147 contracts that were given a transition year, and the 30 pre-controls contracts that were interrupted by controls. The last four rows of Table A1 provide wage settlement regressions for the total public sector that include these three additional dummy variables representing the Ontario government's wage control program. Owing, perhaps to the small number of contracts involved, we detected no significant controls effect for those long-term contracts that were interrupted by the controls program (the estimated coefficients are negative in the one-half to three-quarters of one percentage point range). The coefficient estimates for public sector contracts directly controlled and for contracts in a transition year are all *positive* and significantly greater than zero. While the terms of the transition year, which allowed a wage increase of up to 9 per cent, may have produced wage settlements that were higher than they would have been in the absence of the transition provisions, the positive coefficients on the dummy variable for contracts directly controlled is more disturbing. However, as we shall see below, these wage controls effects for the entire public sector are sharply skewed by wage behaviour in the health subsector.

Table A2 presents separate wage settlement regression equations for the four components of the public sector. Since the inflation catch-up variable was nearly always insignificant in the regressions for the subsectors, it is excluded from the table. In spite of the relative smallness of the samples (for example, there are only 87 individual wage contracts signed by workers employed directly by the provincial government), the price-expectations augmented Phillips curve model performs remarkably well at the disaggregated level. Both the help-wanted index variable and the inflation expectations variable were highly significant determinants of the size of wage settlements in each of the four subsectors during the 1978-83 period (similar results were

TABLE A2

Disaggregated Ontario public sector wage settlement regressions (*t*-statistics in parentheses)

	Constant	Inflation expectations	Reciprocal unemployment	Help wanted index	Contract directly controlled	Transition contract	Interrupted contract	SEE^a	R^2
Education subsector (810 contracts)	−7.69	1.15	36.12	–	–	–	–	2.317	0.454
	(12.36)	(20.76)	(12.09)	–	–	–	–		
	−5.19	1.05	–	1.08	–	–	–	2.293	0.466
	(9.43)	(18.72)	–	(12.92)	–	–	–		
	−4.39	1.09	17.44	–	−1.57	−0.32	−2.37	2.284	0.470
	(3.19)	(18.94)	(2.11)	–	(3.05)	(0.56)	(3.16)		
	−3.77	1.02	–	0.078	−1.17	0.21	−2.15	2.255	0.483
	(5.32)	(17.52)	–	(5.03)	(3.39)	(0.49)	(2.93)		
Local government subsector (323 contracts)	−12.94	1.24	69.09	–	–	–	–	2.177	0.559
	(11.76)	(14.37)	(15.31)	–	–	–	–		
	−7.10	0.98	–	0.201	–	–	–	2.101	0.589
	(8.02)	(11.68)	–	(16.60)	–	–	–		
	−11.55	1.24	59.85	–	−0.79	2.71	0.62	2.154	0.568
	(5.19)	(13.87)	(4.35)	–	(0.88)	(1.83)	(0.87)		
	−6.14	1.01	–	0.164	−1.14	1.96	0.77	2.068	0.602
	(6.17)	(11.03)	–	(6.89)	(2.04)	(1.55)	(1.19)		

TABLE A2 (continued)

	Constant	Inflation expectations	Reciprocal unemployment	Help wanted index	Contract directly controlled	Transition contract	Interrupted contract	SEE^a	R^2
Provincial government subsector (87 contracts)	–15.70	1.51	76.08	–	–	–	–	2.134	0.608
	(7.14)	(8.97)	(9.22)	–	–	–	–		
	–9.67	1.23	–	0.231	–	–	–	2.050	0.638
	(5.51)	(7.80)	–	(9.96)	–	–	–		
	–7.150	1.51	18.42	–	–3.97	–3.46	–1.83	2.074	0.630
	(1.57)	(8.15)	(0.73)	–	(2.48)	(1.40)	(1.55)		
	–8.59	1.43	–	0.148	–2.27	–1.71	–2.33	1.980	0.663
	(3.77)	(8.39)	–	(2.91)	(2.11)	(0.77)	(2.05)		
Health subsector (510 contracts)	–19.24	1.99	72.48	–	–	–	–	4.333	0.473
	(13.96)	(16.48)	(11.13)	–	–	–	–		
	–13.64	1.66	–	0.243	–	–	–	4.118	0.524
	(11.81)	(13.87)	–	(13.84)	–	–	–		
	–32.44	2.18	148.40	–	6.06	4.62	–1.14	4.237	0.496
	(10.40)	(16.58)	(7.72)	–	(4.89)	(3.45)	(0.46)		
	–17.59	1.62	–	0.360	3.50	2.95	–1.00	4.047	0.540
	(12.21)	(11.90)	–	(10.68)	(4.48)	(3.31)	(0.42)		

NOTE: See Table A1.

obtained for the unemployment rate specification, but are not presented to conserve space). At the subsectoral level, all eight inflation expectations coefficients are significantly different from zero. Our 1981 report, by contrast, found very mixed results at the disaggregate level for the 1967-75 period. In that period, the inflation expectations variable was significant in only one subsector and the help-wanted index variable had the wrong sign in three of the four subsectors. The basic theoretical model can account for wage movements in each of the four components of the public sector during the 1978-83 period. In summary, while there are differences in the estimated coefficients for the four subsectors, labour market conditions and inflation expectations significantly affected the size of wage settlements in all four components of the Ontario public sector.

When the three control dummy variables are taken into account at the subsectoral level, the results are very different from the total public sector results in Table A1. For the provincial government subsector, all three control dummy variables have negative coefficients. There are only five contracts altogether in the transition and interrupted controls categories for the provincial government sector; consequently the direct controls category, which contains 23 contracts, is the most important. For provincial government employees directly under the controls program, wage increases in the 1978-83 period were *significantly* lower – by approximately 2 per cent – than they would have been in the absence of controls. In the education subsector, two out of three coefficients for the control dummy variable are negative (and both negative effects are significant). Education employees who were either directly controlled or whose contracts were interrupted by controls (there were ten such contracts) received *significantly* lower wage increases because of the wage controls program (a negative controls effect of between 1.2 per cent and 2 per cent). In the local government subsector, two out of three coefficients for the control dummy variables are not significantly different from zero. The only significant controls effect is a negative one on wage contracts that were directly controlled.

In the health subsector, a very different set of controls effects is observed. While contracts in the health subsector that were interrupted by controls were somewhat lower than they would have been without controls (although this effect is not significant), contracts that were directly under controls or in a transition year were significantly *higher* under the wage control program than they would have been in the absence of the program. Thus the positive and perverse set of controls effects that were obtained in Table A1 for the entire Ontario public sector can be traced to wage behaviour in the health sector. In the remaining three components of the provincial public sector, the Ontario government's wage control program exerted a modest negative effect on wage settlements.

For comparison, we have estimated the basic price-expectations augmented Phillips curve for the Ontario private sector during the 1978 to 1983 period. The econometric results presented in Table A3 are based on a sample of 813 contracts for the inflation catch-up specification and on the full sample of 995 private sector wage contracts for the final two regressions, which exclude the catch-up variable (to permit a direct comparison with our public sector results). It is obvious from Table A3 that inflation expectations, inflation catch-up, and labour market conditions (represented by either the unemployment rate or the normalized help-wanted index) all significantly affected the size of Ontario private sector wage settlements during the 1978-83 period. A comparison of the private sector coefficients in Table A3 with the total public sector coefficients in Table A1 reveals a number of clear differences between the private sector and the public sector. In the private sector, inflation catch-up is much more important than it is in the public sector, but inflation expectations coefficients are much lower in the private sector. However, the relatively higher inflation expectations coefficients in the public sector are offset by much higher negative constants. Finally, there does not appear to be much difference between the labour market coefficients of the private and public sectors. A comparison of rows five and six in Table A1 with rows three and four in Table A3 indicates that the private sector labour market coefficients are somewhat lower than those found in the public sector. These results, like the comparable results in our earlier study, suggest that Ontario public sector wage settlements are as sensitive to changing labour market conditions as are wage settlements in the private sector.

Although the Ontario government's wage control program applied only to public sector workers, we included a control dummy variable in the private sector wage settlement equation for all contracts signed

TABLE A3

Ontario private sector wage settlement regressions (*t*-statistics in parentheses)

Inflation constant	Inflation expectations	Inflation catchup	Reciprocal of unemployment	Help-wanted index	Controls period	SEE^a	R^2
-2.34	0.22	0.30	55.73	–	–	3.392	0.327
(3.25)	(3.94)	(15.90)	(11.12)	–	–		
0.830.17	0.29	–	0.155	–	3.379	0.332	
(1.39)	(2.76)	(15.34)	–	(10.18)	–		
-0.66	0.19	0.30	45.76	–	−1.03	3.360	0.331
(.62)(3.28)	(15.80)	(6.74)	–	(2.17)			
2.130.14	0.29	–	0.126	−1.30	3.360	0.340	
(2.95)	(2.21)	(15.48)	–	(7.14)	(2.94)		
-0.363	0.86	–	36.64	–	−0.27	2.865	0.254
(3.64)	(14.50)	–	(6.78)	–	(0.72)		
-0.77	0.75	–	–	0.107	−0.47	2.835	0.270
(1.16)	(12.64)	–	–	(8.27)	(1.44)		

NOTE: See Table 1A

after 1 October 1982. The results presented in Table A3 suggest that the public sector controls program may have had a modest negative impact on private sector wage bargaining. The dummy variable for the controls period has a significant negative coefficient of just over 1 per cent. (Of course, such a dummy variable could be picking up the effects of some omitted variable, which just happened to change in value during the controls period.)

The results presented in Tables A1 and A3 clearly demonstrate that the traditional price-expectations augmented Phillips curve is alive and well in both the private sector and the public sector in Ontario. As a final econometric check on the results, we estimated the basic theoretical model (excluding the inflation catch-up variable) using the average quarterly wage settlement in the Ontario private and public sectors (and the four components of the public sector as well) rather than micro data on individual contracts (the basis of Tables A1, A2, and A3). Given the possibility of contemporaneous autocorrelation at the micro level, the statistical inferences that we drew from Tables A1, A2, and A3 may be incorrect. Table A4 presents quarterly time-series regressions based on the 1978(Q2) to 1983(Q4) period for our basic price-expectations augmented Phillips curve model, using the normalized help-wanted index specification (similar results were obtained using the unemployment rate variable). While the *t*-scores are somewhat lower than the comparable *t*-scores presented in Tables A1, A2, and A3, 22 of the 24 inflation expectations and labour market coefficients are significantly different from zero (only the coefficients on the help-wanted index in the provincial government sector and the private sector are not significantly different from zero). Furthermore, the comparable coefficient estimates in Tables A1, A2, and A3 are all within one standard error of the coefficient estimates presented in Table A4. With respect to the controls effects, the sign patterns in Table A4 are the same as those obtained from the micro regression results and presented in Tables A1, A2, and A3. However, not all of the controls effects in Table A4 are significantly different from zero, suggesting that some caution is in order in drawing conclusions about the effects of controls on the basis of the results in Tables A1, A2, and A3. Finally, we note that the statistical fit for these quarterly wage settlement regressions is higher in the total public sector than it is in the private sector. Although we do not wish to belabour the point, the traditional price-

TABLE A4
Quarterly wage settlement regressions (*t*-statistics in parentheses)

	Constant	Inflation expectations	Help wanted index	Controls period	R^2
Private sector	–0.61	0.72	0.106	–	0.731
(23 obs)	(0.43)	(5.00)	(5.12)	–	
	0.47	0.72	0.077	–0.80	0.728
	(0.24)	(4.95)	(1.80)	(0.86)	
Public sector	–7.13	1.15	0.159	–	0.817
(23 obs)	(4.13)	(6.53)	(4.94)	–	
	–8.39	1.16	0.193	0.95	0.814
	(3.62)	(6.49)	(3.67)	(0.82)	
Education	–4.07	0.99	0.095	–	0.840
(23 obs)	(3.36)	(7.98)	(4.21)	–	
	–3.98	0.99	0.093	–0.06	0.831
	(2.41)	(7.74)	(2.47)	(0.08)	
Local government	–6.19	0.96	0.181	–	0.789
(23 obs)	(3.44)	(5.21)	(5.37)	–	
	–4.99	0.96	0.148	–0.91	0.784
	(2.06)	(5.13)	(2.69)	(0.75)	
Provincial government	–8.24	1.21	0.194	–	0.663
(19 obs)	(2.63)	(4.05)	(4.03)	–	
	–5.56	1.24	0.107	–2.31	0.680
	(1.52)	(4.25)	(1.36)	(1.35)	
Health	–14.12	1.87	0.195	–	0.735
(22 obs)	(4.31)	(5.13)	(2.86)	–	
	–19.08	1.94	0.310	3.60	0.758
	(4.43)	(5.55)	(3.28)	(1.68)	

expectations augmented Phillips curve does appear to provide a remarkably good explanation for movements in Ontario public sector (average) wage settlements.

Up to this point, our analysis of wage settlements has focused on two factors: inflation and labour market conditions. We have assumed that each bargaining group negotiated its contract in isolation from all other bargaining groups, and we have made no attempt to allow for direct interrelationships or interdependencies between bargaining groups. However, it is frequently alleged that the wage inflation process is intensified by differences in the wages of different groups of workers. Thus there appears to be a fairly widespread belief that large public sector settlements spill over into the private sector and permeate the entire economy. The following analysis seeks to determine the validity of this belief: is it true that wage settlements in Ontario's private sector have been affected by wage settlements in the public sector?[7]

The presence of wage spillovers can only be detected by examining micro wage contract data. However, a nasty methodological problem immediately presents itself: how can one distinguish causation from correlation? Suppose that two successive wage settlements have virtually identical values. The second settlement will obviously correlate very highly with the first, but it may not have been 'caused' by the first. The two settlements may be independent responses to the same economic variables (such as inflation expectations and labour market conditions), which happen to have similar values because the two successive settlements occur very close to each other in time or in space. To avert the danger that a wage spillover effect may be mistaken for some common explanatory variable, all spillover models must be designed to test for the significance of a wage spillover as well as for the significance of other basic wage determinants. Therefore, we have included public sector wage spillover variables along with inflation expectations, inflation catch-up, and labour market conditions in an expanded model of wage contract determination within the private sector.

Table A5 presents micro wage settlement regressions for the private sector that include wage spillover variables drawn from the entire Ontario public sector. Both the last public sector wage settlement and the penultimate public sector wage settlement significantly affect the size of wage settlements in the Ontario private sector. Public sector wage spillover variables based on the third, fourth, and fifth most recent public sector settlements had insignificant effects on private sector wage bargaining and are not included in Table A5. While the last and penultimate public sector wage settlements significantly affect private sector wage settlements,

TABLE A5

Ontario private sector wage settlement regressions with spillovers (*t*-statistics in parentheses)

					Public sector spillover		Private sector spillover		
Constant	Inflation expectations	Inflation catch-up	Help wanted index	Controls period	last	penultimate	last	penultimate	SEE
2.29	0.05	0.27	0.106	−1.27	0.138	–	–	–	3.337
(3.40)	(0.85)	(14.31)	(5.90)	(3.03)	(3.34)	–	–	–	
2.38	0.01	0.26	0.094	−1.24	0.091	0.126	–	–	3.324
(2.99)	(0.08)	(14.08)	(4.88)	(2.56)	(1.81)	(2.03)	–	–	
1.53	0.01	0.26	0.109	−1.29	–	–	0.12	0.11	3.291
(2.09)	(0.13)	(14.73)	(6.06)	(2.78)	–	–	(3.70)	(3.48)	
1.93	−0.01	0.26	0.100	−1.19	0.110	–	0.13	–	3.301
(2.35)	(0.18)	(14.54)	(4.84)	(2.57)	(2.56)	–	(4.09)	–	
1.83	−0.09	0.25	0.088	−1.23	0.070	0.09	0.11	0.09	3.272
(2.42)	(1.09)	(14.27)	(4.72)	(2.78)	(1.22)	(1.74)	(3.13)	(2.41)	

NOTE: Columns 6 to 9 represent the spillover variables. For example, the variable associated with column 6 is the annual percentage change in a public sector contract which is closest (in time) to a given private sector contract. Column 8 refers to the most recent *private* sector contract in the same SIC code for a given private sector settlement.

SEE = Standard error of estimates

an empirical result not found in our 1981 study based on the 1967-75 period, it is important to point out that these public sector spillover effects are quantitatively not very large. The value of the combined coefficients on the two public sector spillover variables is less than 0.22; that is, less than 22 per cent of each additional percentage point of public sector wage inflation feeds into the private sector. Furthermore, the addition of the public sector wage spillover variables considerably lowers the size of the coefficients on inflation expectations, inflation catch-up, and the help-wanted index (similar results are obtained when the reciprocal of the unemployment rate is used rather than the help-wanted index). Thus the additional public sector spillover effect is (partially) offset by a somewhat reduced impact of expected inflation and labour market conditions on private sector wage settlements.

While public sector wage settlements do appear to influence private sector wage increases, wage spillovers from the private sector are likely more important. A 1980 study by Christofides, Swidinsky, and Wilton found that the key distinguishing characteristic of wage spillovers in the Canadian private sector was industrial classification. The study found strong empirical support for the proposition that wage spillovers occur within narrowly defined industries (e.g., the automobile manufacturing industry) and not between widely disparate industries (e.g., not between the mining industry and the brewery industry). Thus a properly specified spillover equation should include spillover variables based on previous wage settlements within the same industry (as the particular observation on the dependent variable). Using the specific industrial classification definitions employed in this earlier study, we divided Ontario's private sector into industrial spillover reference groups (see Table A6 for the exact definitions of these fifteen industrial groups and the number of contracts within each group). We assumed that wage spillovers take place within a particular industrial group (such as textiles) but not between industrial groups.

The third row of Table A5 excludes the two public sector spillover variables and adds the last two settlements within the particular industrial category (to which the dependent variable belongs). These two private sector spillover variables are highly significant (with larger *t*-scores than those found for the public sector spillover variables) and produce a better overall statistical fit for the equation.

TABLE A6
Definition of specific industry reference groups for private sector wage spillover variables

Industry	SIC codes	Number of contracts signed
Forestry and mining	031-099	35
Food manufacturing, including beverages and tobacco	101-153	98
Rubber, leather, and miscellaneous manufacturing	160-179, 380-399	29
Textile products	180-229	43
Clothing products	230-249	43
Wood products, including furniture and fixtures	250-269	46
Paper products	270-279	101
Printing and publishing	280-289	28
Iron, steel, smelting, and metal fabricating	291-309	31
Machinery, aircraft, motor vehicles, railroad manufacturing	310-329	45
Electrical products	330-339	59
Nonmetallic mineral products	340-359	28
Chemical products	360-379	48
Trade	600-699	69
Services	502, 504, 507-529, 573-579, 850-899	40

The last two rows of Table A5 include spillover variables for both the public sector and the private sector. Clearly the private sector spillover variables dominate the public sector spillover variables. When the two previous spillover settlements from both the public sector and the private sector are jointly included in the private sector wage settlement regression, the private sector spillover variables remain highly significant (with *t*-scores of 3.13 and 2.41), whereas the public sector spillover variables are insignificant (with *t*-scores of 1.22 and 1.74). Thus in a properly specified spillover model, which includes private sector as well as public sector spillover effects, wage settlements in the public sector have a minimal impact on private sector wage settlements. As we found in our 1981 report, there is no strong statistical support for the proposition that public sector wage settlements (high or low) spill over into the private sector, increasing or decreasing the rate of private sector wage inflation.

Notes

1 It is of interest to note that Mr. Miller's successor, Larry Grossman, made no mention of wage spillovers when he introduced the second year of wage controls. The extension of controls into 1983-4 was necessary to ensure the existing level of employment in the public sector, given that revenues in all parts of the public sector were expected to rise by no more than 5 per cent.

2 Using only collective bargaining data for both the private sector and the public sector avoids problems associated with different levels of unionization.

3 For a discussion of this hypothesis, see Auld et al. (1980).

4 That is, the higher is the unemployment rate, the higher is the rate of wage inflation.

5 It must be kept in mind that the dummy variable could be serving as a proxy for an omitted variable in the private sector wage equation.

6 For a detailed discussion of this point, see L. Christofides, R. Swidinsky, and D. Wilton (1980).

7 For a discussion of the theoretical rationale for wage spillovers, the interested reader is again referred to Auld and Wilton (1981) and to Auld et al. (1979).

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